

Practitioner's Docket No. _____

1843-1

10/070100
1007070100
JC10 Rec'd PCT/PTO 28 FEB 2002

CHAPTER II

Preliminary Classification:

Proposed Class:

Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P., § 601, 7th ed.

**TRANSMITTAL LETTER
TO THE UNITED STATES ELECTED OFFICE (EO/US)
(ENTRY INTO U.S. NATIONAL PHASE UNDER CHAPTER II)**

INTERNATIONAL APPLICATION NO	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/06454	2 Sep. 1999	2 Sep. 1999
TITLE OF INVENTION		
PERMANENT MAGNETIC LIQUID TREATING DEVICE		
APPLICANT(S)		
JANS, Manfred Ernst		

Box PCT

Assistant Commissioner for Patents

Washington D.C. 20231

ATTENTION: EO/US

CERTIFICATION UNDER 37 C.F.R. §§ 1.8(a) and 1.10*

*(When using Express Mail, the Express Mail label number is mandatory;
Express Mail certification is optional.)*

I hereby certify that, on the date shown below, this correspondence is being:

MAILING

☒ deposited with the United States Postal Service in an envelope addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

37 C.F.R. § 1.8(a)

37 C.F.R. § 1.10 *

☐ with sufficient postage as first class mail.

☒ as "Express Mail Post Office to Addressee"

Mailing Label No.:

EL801596277US

TRANSMISSION

☐ facsimile transmitted to the Patent and Trademark Office, (703) _____

Date: _____

FEB 28 2002

Signature _____

John S. Egbert

(type or print name of person certifying)

* Only the date of filing (§ 1.6) will be the date used in a patent term adjustment calculation, although the date on any certificate of mailing or transmission under § 1.8 continues to be taken into account in determining timeliness. See § 1.703(f). Consider "Express Mail Post Office to Addressee" (§ 1.10) or facsimile transmission (§ 1.6(d)) for the reply to be accorded the earliest possible filing date for patent term adjustment calculations.

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 1 of 9)

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NOTE: To avoid abandonment of the application, the applicant shall furnish to the USPTO, not later than 20 months from the priority date: (1) a copy of the international application, unless it has been previously communicated by the International Bureau or unless it was originally filed in the USPTO; and (2) the basic national fee (see 37 C.F.R. § 1.492(a)). The 30-month time limit may not be extended. 37 C.F.R. § 1.495.

WARNING: Where the items are those which can be submitted to complete the entry of the international application into the national phase are subsequent to 30 months from the priority date the application is still considered to be in the international state and if mailing procedures are utilized to obtain a date the express mail procedure of 37 C.F.R. § 1.10 must be used (since international application papers are not covered by an ordinary certificate of mailing—See 37 C.F.R. § 1.8.

NOTE: Documents and fees must be clearly identified as a submission to enter the national state under 35 U.S.C. § 371 otherwise the submission will be considered as being made under 35 U.S.C. § 111. 37 C.F.R. § 1.494(f).

- I. Applicant herewith submits to the United States Elected Office (EO/US) the following items under 35 U.S.C. § 371:
- a. ☒ This express request to immediately begin national examination procedures (35 U.S.C. § 371(f)).
 - b. ☒ The U.S. National Fee (35 U.S.C. § 371(c)(1)) and other fees (37 C.F.R. § 1.492) as indicated below:

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(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 3 of 9)

5. ☐ Amendments to the claims of the International application under PCT Article 19 (35 U.S.C. § 371(c)(3)):

NOTE: The Notice of January 7, 1993 points out that 37 C.F.R. § 1.495(a) was amended to clarify the existing and continuing practice that PCT Article 19 amendments must be submitted by 30 months from the priority date and this deadline may not be extended. The Notice further advises that: "The failure to do so will not result in loss of the subject matter of the PCT Article 19 amendments. Applicant may submit that subject matter in a preliminary amendment filed under section 1.121. In many cases, filing an amendment under section 1.121 is preferable since grammatical or idiomatic errors may be corrected." 1147 O.G. 29-40, at 36.

- a. ☐ are transmitted herewith.
- b. ☐ have been transmitted
 - i. ☐ by the International Bureau.
Date of mailing of the amendment (from form PCT/1B/308):

 - ii. ☐ by applicant on _____. (Date)
- c. ☐ have not been transmitted as
 - i. ☐ applicant chose not to make amendments under PCT Article 19.
Date of mailing of Search Report (from form PCT/ISA/210.):

 - ii. ☐ the time limit for the submission of amendments has not yet expired. The amendments or a statement that amendments have not been made will be transmitted before the expiration of the time limit under PCT Rule 46.1.

6. ☐ A translation of the amendments to the claims under PCT Article 19 (38 U.S.C. § 371(c)(3)):

- a. ☐ is transmitted herewith.
- b. ☐ is not required as the amendments were made in the English language.
- c. ☐ has not been transmitted for reasons indicated at point 5(c) above.

7. ☒ A copy of the international examination report (PCT/IPEA/409)

- ☒ is transmitted herewith.
- ☐ is not required as the application was filed with the United States Receiving Office.

8. ☐ Annex(es) to the international preliminary examination report

- a. ☐ is/are transmitted herewith.
- b. ☐ is/are not required as the application was filed with the United States Receiving Office.

9. ☐ A translation of the annexes to the international preliminary examination report

- a. ☐ is transmitted herewith.
- b. ☐ is not required as the annexes are in the English language.

10. ☒ An oath or declaration of the inventor (35 U.S.C. § 371(c)(4)) complying with 35 U.S.C. § 115
- a. ☐ was previously submitted by applicant on _____. (Date)
 - b. ☐ is submitted herewith, and such oath or declaration
 - i. ☐ is attached to the application.
 - ii. ☐ identifies the application and any amendments under PCT Article 19 that were transmitted as stated in points 3(b) or 3(c) and 5(b); and states that they were reviewed by the inventor as required by 37 C.F.R. § 1.70.
 - c. ☒ will follow.

II. Other document(s) or information included:

11. ☒ An International Search Report (PCT/ISA/210) or Declaration under PCT Article 17(2)(a):
- a. ☒ is transmitted herewith.
 - b. ☐ has been transmitted by the International Bureau.
Date of mailing (from form PCT/IB/308): _____.
 - c. ☐ is not required, as the application was searched by the United States International Searching Authority.
 - d. ☐ will be transmitted promptly upon request.
 - e. ☐ has been submitted by applicant on _____. (Date)

12. ☐ An Information Disclosure Statement under 37 C.F.R. §§ 1.97 and 1.98:

- a. ☐ is transmitted herewith.

Also transmitted herewith is/are:

- ☐ Form PTO-1449 (PTO/SB/08A and 08B).
- ☐ Copies of citations listed.
- b. ☐ will be transmitted within THREE MONTHS of the date of submission of requirements under 35 U.S.C. § 371(c).
- c. ☐ was previously submitted by applicant on _____. (Date)

13. ☐ An assignment document is transmitted herewith for recording.

A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

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14. ☒ Additional documents:

- a. ☐ Copy of request (PCT/RO/101)
- b. ☒ International Publication No. WO 01/17913
- i. ☐ Specification, claims and drawing
- ii. ☒ Front page only
- c. ☒ Preliminary amendment (37 C.F.R. § 1.121)
- d. ☐ Other

15. ☒ The above checked items are being transmitted

- a. ☒ before 30 months from any claimed priority date.
- b. ☐ after 30 months.

16. ☐ Certain requirements under 35 U.S.C. § 371 were previously submitted by the applicant on _____, namely:**AUTHORIZATION TO CHARGE ADDITIONAL FEES**

WARNING: Accurately count claims, especially multiple dependant claims, to avoid unexpected high charges if extra claims are authorized.

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

☒ Please charge, in the manner authorized above, the following additional fees that may be required by this paper and during the entire pendency of this application:

- ☒ 37 C.F.R. § 1.492(a)(1), (2), (3), and (4) (filing fees)

WARNING: Because failure to pay the national fee within 30 months without extension (37 C.F.R. § 1.495(b)(2)) results in abandonment of the application, it would be best to always check the above box.

(Transmittal Letter to the United States Elected Office (EO/US) [13-18]—page 8 of 9)

☐ 37 C.F.R. § 1.492(b), (c) and (d) (presentation of extra claims) 28 FEB 2002

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.492(d)), it might be best not to authorize the PTO to charge additional claim fees, except possible when dealing with amendments after final action.

☐ 37 C.F.R. § 1.17 (application processing fees)

☐ 37 C.F.R. § 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a).

☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

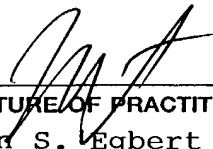
NOTE: 37 C.F.R. § 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying . . . issue fee." From the wording of 37 C.F.R. § 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

☐ 37 C.F.R. § 1.492(e) and (f) (surcharge fees for filing the declaration and/or filing an English translation of an International Application later than 30 months after the priority date).

Reg. No.: 30,627

Tel. No.: (713) 224-8080

Customer No.: 24106


SIGNATURE OF PRACTITIONER

John S. Egbert

(type or print name of practitioner)

Harrison & Egbert
412 Main St., 7th Floor

P.O. Address

Houston, Texas 77002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: JANS, Manfred Ernst

SERIAL NO.: (International Serial No. PCT/EP99/06454)

FILED: Herewith (International Filing Date: September 2, 1999)

TITLE: PERMANENT MAGNETIC LIQUID TREATING DEVICE

APPLICATION DATA SHEET UNDER 37 C.F.R. § 1.76

Commissioner of Patents
and Trademarks
Washington, D.C. 20231

BIBLIOGRAPHIC DATA

1. Applicant Information (SMALL ENTITY)

Applicant: Manfred Ernst JANS
Citizenship: German
Residence: Bahnhofstrasse 5
D-55437 Ockenheim
GERMANY

2. Correspondence Information

Name: John S. Egbert
Harrison & Egbert
Address: 412 Main Street, 7th Floor
Houston, Texas 77002 USA

3. Application Information

Title: PERMANENT MAGNETIC LIQUID TREATING DEVICE

Docket No.: 1843-1

Suggested Classification

Class:

SubClass:

Tech Center to which subject matter is assigned:

Total Number of Drawings Sheets: 1

Type of Application:

☒ Utility

☐ application to be published

suggested drawing figure for publication: ☐

☐ application is not to be published.

☐ Plant

Latin name of the genus:

Latin name of the species:

of the plant being claimed.

☐ Design

☐ Reissue

☐ Provisional

Secrecy order under § 5.2:

This application

☒ does not disclose

☐ discloses a significant part of the

subject matter of an application which is under a secrecy order pursuant to § 5.2.

4. Representative Information

The following have a power of attorney or authorization of agent in this application:

Name: John S. Egbert, Reg. No. 30,627
Andrew W. Chu, Reg. No. 46,625
Al Harrison, Reg. No. 31,708

Address: Harrison & Egbert, 412 Main Street, 7th Floor, Houston, Texas 77002 USA

Customer No.: 24106

5. Domestic Priority Information

Domestic priority for this application is claimed as follows:

35 U.S.C. §365(c) [national stage priority]

Appn No.: PCT/EP99/06454

Filed: September 2, 1999

Status: entering Chapter II of the PCT

Relationship: national stage priority

Published as WO 01/17913

6. Foreign Priority Information

Not Applicable.

7. Assignee information

Not Applicable.

Respectfully submitted,

Date

2-25-02



John S. Egbert

Reg. No. 30,627

Attorney for Applicant

Customer No. 24106

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: JANS, Manfred Ernst

SERIAL NO.: (International Serial No. PCT/EP99/06454)

FILED: Herewith (International Filing Date: September 2, 1999)

TITLE: PERMANENT MAGNETIC LIQUID TREATING DEVICE

PRELIMINARY AMENDMENT

Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

In conjunction with the filing of the present application, and prior to an initial Official Action on this matter, please amend the above-identified application as follows:

Please note that the following amendments apply to the attached specification and claims labeled for U.S. filing. This combined application incorporates the original application and any annex to the International Preliminary Examination Report in the proper order, including any correct original and substitute pages, claims and drawing sheets.

IN THE SPECIFICATION

In Paragraph [0002], please substitute the paragraph as follows:

A permanent magnetic liquid treating device of this kind is known by German Patent No. DE 195 32 357 A1 and this document forms the basis of the pre-characterizing part of claim 1. Such devices, which are also known from other patent documents, are used especially for the magnetic treatment of water in order to avoid the formation of lime deposits at the inner wall of pipes and tanks by causing that the calcium carbonate which is dissolved in the water is deposited not at the walls but in the form of separable fine particles.

In Paragraph [0007], please substitute the paragraph as follows:

Further features and advantages of the invention will become apparent by the following description of an embodiment, by way of example, and without limitation, referring to the attached drawings.

In Paragraph [0008], please substitute the paragraph as follows:

Fig. 1 a schematic view of an axial longitudinal section of a liquid treating device according to the invention, the strip being shown in side view.

In Paragraph [0009], please substitute the paragraph as follows:

Fig. 2 is a schematic view of the arrangement of the ring magnets of fig. 1 without the housing and inner tube.

In Paragraph [0010], please substitute the paragraph as follows:

Fig. 3 and 4 are detailed plan views of two other embodiments of the inlet terminal part of the strip of the device of fig. 1.

IN THE CLAIMS

In Claim 1, please substitute the claim as follows:

1. (Amended) A permanent magnetic liquid treating device (1) comprising
 - a tubular housing (2) in which ring magnets (3) and magnetizable spacer discs (4) are located, coaxially to the longitudinal axis of the housing, and which comprises connecting pieces (5) at both ends, and comprising means causing a spiral motion of the liquid passing therethrough, and
 - an inner tube (6) which is located in the housing, coaxially to the longitudinal axis thereof and at a distance from the inner wall of the housing, the ends of said inner tube being connected liquid-tightly to said connecting pieces, the liquid to be treated flowing through said inner tube, and the ring magnets (3) and spacer discs (4) being installed in the liquid-free space between the inner tube (6) and the tubular housing (2) in such a way that they lie one behind the other in the direction of the longitudinal axis of the housing,
 - wherein said tubular housing (2) is comprised of a non-magnetizable material;
 - wherein said inner tube (6) is comprised of a magnetizable rustproof metal;
 - wherein said tubular connecting pieces (5) comprised of a magnetizable rustproof metal extend the inner tube (6) and form a single piece therewith;
 - wherein said ring magnets (3) which are identical to each other are arranged in the ring space between the housing (2) and the inner tube (6) so that, beginning from the liquid inlet (E), there follows, after a single spacer disc (4), a ring magnet (3) with its south pole directed towards the inlet, then, each time after two single spacer discs (4), three ring magnets (3) with the polarity inverted from one to the next, and at last two twinned ring magnets (3a, 3b), again with polarity inverted in relation to the preceding ring magnet and to the following twinned ring magnet, the single ring magnets (3a, 3b) which comprise each twinned magnet contacting each other with opposite poles so that a south pole is at the outside of the stack, and a final thicker spacing disc (4);

wherein a complete stack of ring magnets (3) and spacer discs (4) is held immovable and tightly enclosed in the housing (2) by means of sleeves (9) screwed upon the connecting pieces (5);

wherein said inner tube (6) fixedly holds a strip (7) comprised of a magnetizable rustproof metal having a width corresponding to the inner diameter of the inner tube (6), said strip being wound to a helix with 1 to 3 turns; and

wherein said metal strip (7) extends with each one of its end sections (8) into the connecting pieces (5), said end sections being without helix and diametrically opposed.

In Claim 2, please substitute the claim as follows:

2. (Amended) A permanent magnetic liquid treating device according to claim 1, characterized in that the housing (2) is comprised of aluminum or an aluminum alloy and that the inner tube (6), the connecting pieces (5) and the end sleeves which are screwed upon the threading of the connecting pieces consist of special steel.

In Claim 3, please substitute the claim as follows:

3. (Amended) A permanent magnetic liquid treating device according to Claim 1, wherein an axial dimension of each ring magnet (3) is 9 mm and that of the spacer discs (4) is 3 mm, and the last spacer disc (4) at the outlet side having a thickness of 6 mm.

In Claim 4, please substitute the claim as follows:

4. (Amended) A permanent magnetic liquid treating device according to Claim 1, wherein said inner tube (6) has a diameter of 0.5 inch (12.6 mm) and a length of 100 mm. and that the helically wound strip (7) being prepared from a sheet of special steel of 0.5 mm thickness has 1 to 2 helix windings in the inner tube.

In Claim 5, please substitute the claim as follows:

5. (Amended) A permanent magnetic liquid treating device according to Claim 1, wherein an elastic sealing ring (10) surrounding the inner tube (6) is inserted between each of the outwardly last spacer discs (4) and the adjacent sleeve (9).

In Claim 6, please substitute the claim as follows:

6. (Amended) A permanent magnetic liquid treating device according to Claim 1, wherein said helically wound strip (7) is smooth or comprised of projections which serve to create turbulence within the liquid flowing therethrough.

In Claim 7, please substitute the claim as follows:

7. (Amended) A permanent magnetic liquid treating device according to Claim 1, wherein said helix-free diametrical terminal section (8) of the metal strip (7) at the inlet end extends outwardly from the connecting piece (5) and terminates in a tip (14) with rounded straight edges or in a rounded tip (12) with a rounded round edge (12a).

In Claim 8, please substitute the claim as follows:

8. (Amended) A permanent magnetic liquid treating device according to Claim 1, wherein at least the edges (14a, 12a) of the tips (14, 12) of the strip (7) have a coating of plastics material.

In Claim 9, please substitute the claim as follows:

9. (Amended) A permanent magnetic liquid treating device according to Claim 1, wherein both sides of the strip (7) are covered with a plastic coating.

In Claim 10, please substitute the claim as follows:

10. (Amended) A permanent magnetic liquid treating device according to Claim 1, wherein an insert (11) which reduces the flow section is arranged in the connecting piece (5) which is situated at the outlet side.

In Claim 11, please substitute the claim as follows:

11. (Amended) A permanent magnetic liquid treating device according to Claim 1, wherein said terminal outer part of the connecting pieces (5) is comprised of a threading or smooth ondulations for connection with a connecting pipe or tube, respectively.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: JANS, Manfred Ernst

SERIAL NO.: (International Serial No. PCT/EP99/06454)

FILED: Herewith (International Filing Date: September 2, 1999)

TITLE: PERMANENT MAGNETIC LIQUID TREATING DEVICE

REMARKS ON PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In this preliminary amendment, please consider the following remarks in conjunction with the amendments to the above-identified application as follows:

REMARKS

The present Preliminary Amendment has been entered for the purpose of placing the application into a more proper U.S. format. In particular, certain grammatical and idiomatic inconsistencies have been corrected by amendment to the specification, and the application is corrected for certain typographical errors found in the originally submitted application. No new matter has been added by these amendments. The present application incorporates the original filing including any amendments made in the annex to the International Preliminary Examination Report and changes to the drawing sheets.

The Claims have been amended so as to conform with U.S. requirements and so as to remove multiple dependent claims.

Applicant respectfully requests that the present Amendment be entered prior to an initial Official Action on the present application.

Date

2-25-02

Respectfully submitted,



John S. Egbert

Reg. No. 30,627

Attorney for Applicant

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: JANS, Manfred Ernst

SERIAL NO.: (International Serial No. PCT/EP99/06454)

FILED: Herewith (International Filing Date: September 2, 1999)

TITLE: PERMANENT MAGNETIC LIQUID TREATING DEVICE

VERSION WITH MARKINGS TO SHOW CHANGES in the PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In conjunction with the filing of the present application, and prior to an initial Official Action on this matter, please amend the above-identified application as follows:

IN THE SPECIFICATION

In Paragraph [0002], the paragraph has been amended as follows:

A permanent magnetic liquid treating device of this kind is known by German Patent No. DE 195 32 357 A1 and this document forms the basis of the pre-characterizing part of claim 1. Such devices, which are also known from other patent documents, are used especially for the magnetic treatment of water in order to avoid the formation of lime deposits at the inner wall of pipes and tanks by causing that the calcium carbonate which is dissolved in the water is deposited not at the walls but in the form of separable fine particles.

In Paragraph [0007], the paragraph has been amended as follows:

Further features and advantages of the invention will become apparent by the following description of an embodiment, by way of example, and without limitation, referring to the attached [drawings which show:] drawings.

In Paragraph [0008], the paragraph has been amended as follows:

Fig. 1 a [schematic] schematic view of an axial longitudinal section of a liquid treating device according to the invention, the strip being shown in side [view;] view.

In Paragraph [0009], the paragraph has been amended as follows:

Fig. 2 is a schematic view of the arrangement of the ring magnets of fig. 1 without the housing and inner [tube;] tube.

In Paragraph [0010], the paragraph has been amended as follows:

Fig. 3 and 4 [a detail] are detailed plan views of two other embodiments of the inlet terminal part of the strip of the device of fig. 1.

IN THE CLAIMS

In Claim 1, the claim has been amended as follows:

1. (Amended) A permanent magnetic liquid treating device (1) comprising
a tubular housing (2) in which ring magnets (3) and magnetizable spacer discs (4) are located, coaxially to the longitudinal axis of the housing, and which [has] comprises connecting pieces (5) at both ends, and comprising means causing a spiral motion of the liquid passing therethrough, and

an inner tube (6) which is located in the housing, coaxially to the longitudinal axis thereof and at a distance from the inner wall of the housing, the ends of said inner tube being connected liquid-tightly to said connecting pieces, the liquid to be treated flowing through said inner tube, and the ring magnets (3) and spacer discs (4) being installed in the liquid-free space between the inner tube (6) and the tubular housing (2) in such a way that they lie one behind the other in the direction of the longitudinal axis of the housing, [characterized by the following features:]

[a] the] wherein said tubular housing (2) [consists] is comprised of a non-magnetizable material;

[b] the] wherein said inner tube (6) [consists] is comprised of a magnetizable rustproof metal;

[c] the] wherein said tubular connecting pieces (5) [consisting] comprised of a magnetizable rustproof metal extend the inner tube (6) and form a single piece therewith;

[d] the] wherein said ring magnets (3) which are identical to each other are arranged in the ring space between the housing (2) and the inner tube (6) so that, beginning from the liquid inlet (E), there [follow,] follows, after a single spacer disc (4), a ring magnet (3) with its south pole directed towards the inlet, then, each time after two single spacer discs (4), three ring magnets (3) with the polarity inverted from one to the next, and at last two twinned ring magnets (3a, 3b), again with polarity inverted in relation to the preceding ring magnet and to the following twinned ring magnet, the single ring magnets (3a, 3b) which [constitute] comprise each twinned magnet contacting each

other with opposite poles so that a south pole is at the outside of the stack, and a final thicker spacing disc (4)[.];

[e] the] wherein a complete stack of ring magnets (3) and spacer discs (4) is held immovable and tightly enclosed in the housing (2) by means of sleeves (9) screwed upon the connecting pieces (5);

[f] in the] wherein said inner tube (6) [there is] fixedly [held] holds a strip (7) [consisting] comprised of a magnetizable rustproof metal having a width corresponding to the inner diameter of the inner tube (6), said strip being wound to a helix with 1 to 3 turns; and

[g] the] wherein said metal strip (7) extends with each one of its end sections (8) into the connecting pieces (5), said end sections being without helix and diametrically opposed.

In Claim 2, the claim has been amended as follows:

2. (Amended) A permanent magnetic liquid treating device according to claim 1, characterized in that the housing (2) [consists] is comprised of aluminum or an aluminum alloy and that the inner tube (6), the connecting pieces (5) and the end sleeves which are screwed upon the threading of the connecting pieces consist of special steel.

In Claim 3, the claim has been amended as follows:

3. (Amended) A permanent magnetic liquid treating device according to [one of claims 1 or 2, characterized in that the] Claim 1, wherein an axial dimension of each ring magnet (3) is 9 mm and that of the spacer discs (4) is 3 mm, and the last spacer disc (4) at the outlet side having a thickness of 6 mm.

In Claim 4, the claim has been amended as follows:

4. (Amended) A permanent magnetic liquid treating device according to [any of claims 1 to 3, characterized in that the] Claim 1, wherein said inner tube (6) has a diameter of 0.5 inch (12.6 mm) and a length of 100 mm. and that the helically wound strip (7) being prepared from a sheet of special steel of 0.5 mm thickness has 1 to 2 helix windings in the inner tube.

In Claim 5, the claim has been amended as follows:

5. (Amended) A permanent magnetic liquid treating device according to [any of the preceding claims, characterized in that] Claim 1, wherein an elastic sealing ring (10) surrounding the inner tube (6) is inserted between each of the outwardly last spacer discs (4) and the adjacent sleeve (9).

In Claim 6, the claim has been amended as follows:

6. (Amended) A permanent magnetic liquid treating device according to [any of claims 1 to 5, characterized in that the] Claim 1, wherein said helically wound strip (7) is smooth or [provided with] comprised of projections which serve to create turbulence within the liquid flowing therethrough.

In Claim 7, the claim has been amended as follows:

7. (Amended) A permanent magnetic liquid treating device according to [any of the claims 1 to 6, characterized in that the] Claim 1, wherein said helix-free diametrical terminal section (8) of the metal strip (7) at the inlet end extends outwardly from the connecting piece (5) and terminates in a tip (14) with rounded straight edges or in a rounded tip (12) with a rounded round edge (12a).

In Claim 8, the claim has been amended as follows:

8. (Amended) A permanent magnetic liquid treating device according to [any of claims 1 to 7, characterized in that] Claim 1, wherein at least the edges (14a, 12a) of the tips (14, 12) of the strip (7) have a coating of plastics material.

In Claim 9, the claim has been amended as follows:

9. (Amended) A permanent magnetic liquid treating device according to [any of the claims 1 to 8, characterized in that] Claim 1, wherein both sides of the strip (7) are covered with a plastic coating.

In Claim 10, the claim has been amended as follows:

10. (Amended) A permanent magnetic liquid treating device according to [any of the claims 1 to 9, characterized in that] Claim 1, wherein an insert (11) which reduces the flow section is arranged in the connecting piece (5) which is situated at the outlet side.

In Claim 11, the claim has been amended as follows:

11. (Amended) A permanent magnetic liquid treating device according to [any of the claims 1 to 10, characterized in that the] Claim 1, wherein said terminal outer part of the connecting pieces (5) is [provided with] comprised of a threading or smooth undulations for connection with a connecting pipe or tube, respectively.

11/PRTS

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PERMANENT MAGNETIC LIQUID TREATING DEVICE

RELATED U.S. APPLICATIONS

Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED
RESEARCH OR DEVELOPMENT

Not applicable.

REFERENCE TO MICROFICHE APPENDIX

Not applicable.

FIELD OF THE INVENTION

[0001] The invention relates to a permanent magnetic liquid treating device comprising a tubular housing in which ring magnets and magnetizable spacer discs are located, coaxially to the longitudinal axis of the housing, and which has connecting pieces at both ends, said device comprising means which cause a spiral motion of the liquid passing therethrough, and an inner tube which is located in the housing, coaxially to the longitudinal axis thereof and at a distance from the inner wall of the housing, the ends of said inner tube being connected liquid-tight to said connecting pieces, and the ring magnets and spacer discs being installed in the liquid-free space between the inner tube and the tubular housing so that they lie one behind the other in the direction of the longitudinal axis of the housing.

BACKGROUND OF THE INVENTION

[0002] A permanent magnetic liquid treating device of this kind is known by DE 195 32 357 A1 and this document forms the basis of the pre-characterizing part of claim 1. Such devices, which are also known

from other patent documents, are used especially for the magnetic treatment of water in order to avoid the formation of lime deposits at the inner wall of pipes and tanks by causing that the calcium carbonate which is dissolved in the water is deposited not at the walls but in the form of separable fine particles.

[0003] While the treating device referred to above is in principle suitable for this purpose, its effect is not yet fully satisfactory. The rotating turbine which in the known device is used for creating a spiral motion of the liquid flowing therethrough can not provide for a spiral motion which is constant over the total length of the device, and the construction of the known device furthermore causes an undesirable higher pressure drop.

BRIEF SUMMARY OF THE INVENTION

[0004] The object of the invention is therefore to improve a treating device of the above described type in such way that its construction is simplified and its effectiveness is clearly improved, that is that the formation of scale in pipes and tanks through which tap water flows but also in the liquid circulation of for example boilers or washing machines is avoided to an even higher degree.

[0005] This object is achieved by the dispositions of the characterizing part of claim 1. Preferred embodiments are described in the dependent claims.

[0006] By the cooperation of the specific coaxial arrangement of a stack of cylindrical ring magnets which are separated from each other by spacer discs consisting of metal and which surround an inner tube, with a helically wound strip consisting of a magnetizable rustproof metal, the width of which corresponds to the inner diameter of the inner tube and which is arranged in, said inner tube, the desired helical motion of the liquid flowing therethrough is realized in an even manner and practically without pressure drop and without moving parts, and an improvement of the magnetic flow which acts upon the

molecules of the water flowing therethrough is achieved. The device according to the invention is of notably simple construction and can be manufactured at low costs.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0007] Further features and advantages of the invention will become apparent by the following description of an embodiment, by way of example, and without limitation, referring to the attached drawings which show:

[0008] Fig. 1 a schematical view of an axial longitudinal section of a liquid treating device according to the invention, the strip being shown in side view;

[0009] Fig. 2 the arrangement of the ring magnets of fig. 1 without the housing and inner tube;

[0010] Fig. 3 and 4 a detail of two other embodiments of the inlet terminal part of the strip of the device of fig. 1.

DETAILED DESCRIPTION OF THE INVENTION

[0011] The permanent magnetic liquid treating device 1 shown in fig. 1 comprises a tubular housing 2 in which ring magnets 3 and magnetizable spacer discs 4 are arranged coaxially to the longitudinal axis of the housing and which at both ends comprises connecting pieces 5 which are formed in one piece with the inner tube 6 and form an extension thereof. The tubular housing 2 consists of a non-magnetizable material, here an aluminum alloy, while the inner tube 6 and the tubular connecting pieces 5 consists of a magnetizable rustproof metal, here special (stainless) steel, and the ring magnets and spacer discs are mounted one behind the other in form of a stack in the liquid-free space between the inner tube and the tubular housing. The stack is held unmovable and tightly enclosed in the housing by terminal sleeves 9 which are screwed on the connecting pieces 5 from both sides, an elastic sealing ring (O-ring) 10 being

inserted between the stack and each sleeve. The terminal sleeves 9 preferably consists also of special steel.

[0012] In order to cause a helical movement of the liquid flowing therethrough, a strip 7 of magnetizable rustproof metal which is wound to 1 to 2 helical windings is arranged in the inner tube 6, the width of the strip corresponding to the inner diameter of the inner tube 6. This strip is fixedly connected at both ends with the tubular connecting pieces, for example by welding to the inner wall thereof. The stack of ring magnets 3 which are all alike and spacer discs 4 is arranged as shown in fig. 2, so that beginning from the liquid inlet E, after a single spacer disc 4, a ring magnet 3 with its south pole at the inlet side, then is followed by two single spacer discs 4 and three ring magnets 3, each separated from the next by two spacer discs (4) and each with a polarization inverted from one to the next, and at last two twinned ring magnets 3a, 3b, again separated from the preceding ring magnet (3) and from each other by two spacer discs (4) and having a polarization which is inverted in respect to the preceding ring magnets and to the following twinned ring magnets, the single ring magnets 3a, 3b forming the twinned ring magnets contacting each other with opposite poles, so that at the outlet side of the stack there is a south pole, and the stack is terminated by a thicker spacer disc 4.

[0013] In the embodiment shown, the ring magnets have each an axial dimension of 9 mm and the spacer discs 4 an axial dimension of 3 mm, the last spacer disc at the outlet side having a thickness of 6 mm. Also in this example as shown, the inner tube 6 has a diameter of 0.5 inch (12.6 mm) and a length of 100 mm, and the helically wound strip is formed as a helix from a sheet of special steel of 0.5 mm thickness.

[0014] The helical windings of the wound strip lie within the inner tube 6, that is between the connecting pieces 5, and their number can be between 1 and 3, for example 2 as shown in fig. 1. The helically wound strip 7 extends into both connecting pieces 5 with each a diametrical opposed terminal part 8

without helical winding and is in this part provided with a recess 8a in order to facilitate fixation at the connecting part 5, for example by spot welding.

[0015] Optionally, the strip 7 can be formed without recess 8a at the inlet end thereof and can be provided with an inlet tip 14 which projects from the connecting piece 5 (fig. 3). This tip is directed against the direction of the flow and is rounded in front and at the edges 14a and preferably, at least at the edge, provided with smooth plastic coating. Instead, the inlet tip 12 can also be rounded with rounded edges 12a and preferably also be provided with a plastic coating (at least at the edge) (fig. 4). These smooth inlet tips avoid the attaching of fluff on the inlet edge of the metal strip 7. Optionally, the metal strip 7 can be coated with plastic material over all of its length.

[0016] If required, the flow section at the liquid outlet can be somewhat diminished by means of an insert 11 which is held at the end of the outlet connecting piece 5 in order to upwardly reduce the velocity of the liquid flow upwards of this end. In order to facilitate the installation of the permanent magnetic liquid treating device in a liquid conduct the connecting pieces 5 are provided at their end with an appropriate threading for connection to a pipe or provided with smooth ondulations for insertion in and fixation of connecting tubing.

CLAIMS

I claim:

1. A permanent magnetic liquid treating device (1) comprising
a tubular housing (2) in which ring magnets (3) and magnetizable spacer discs (4) are located, coaxially to the longitudinal axis of the housing, and which has connecting pieces (5) at both ends, and comprising means causing a spiral motion of the liquid passing therethrough, and
an inner tube (6) which is located in the housing, coaxially to the longitudinal axis thereof and at a distance from the inner wall of the housing, the ends of said inner tube being connected liquid-tightly to said connecting pieces, the liquid to be treated flowing through said inner tube, and the ring magnets (3) and spacer discs (4) being installed in the liquid-free space between the inner tube (6) and the tubular housing (2) in such a way that they lie one behind the other in the direction of the longitudinal axis of the housing, characterized by the following features:
 - a) the tubular housing (2) consists of a non-magnetizable material;
 - b) the inner tube (6) consists of a magnetizable rustproof metal;
 - c) the tubular connecting pieces (5) consisting of a magnetizable rustproof metal extend the inner tube (6) and form a single piece therewith;
 - d) the ring magnets (3) which are identical to each other are arranged in the ring space between the housing (2) and the inner tube (6) so that, beginning from the liquid inlet (E), there follow, after a single spacer disc (4), a ring magnet (3) with its south pole directed towards the inlet, then, each time after two single spacer discs (4), three ring magnets (3) with the polarity inverted from one to the next, and at last two twinned ring magnets (3a, 3b), again with polarity inverted in relation to the preceding ring magnet and to the following twinned ring magnet, the single ring magnets (3a, 3b) which constitute

each twinned magnet contacting each other with opposite poles so that a south pole is at the outside of the stack, and a final thicker spacing disc (4).

e) the complete stack of ring magnets (3) and spacer discs (4) is held immovable and tightly enclosed in the housing (2) by means of sleeves (9) screwed upon the connecting pieces (5);

f) in the inner tube (6) there is fixedly held a strip (7) consisting of a magnetizable rustproof metal having a width corresponding to the inner diameter of the inner tube (6), said strip being wound to a helix with 1 to 3 turns;

g) the metal strip (7) extends with each one of its end sections (8) into the connecting pieces (5), said end sections being without helix and diametrically opposed.

2. A permanent magnetic liquid treating device according to claim 1, characterized in that the housing (2) consists of aluminum or an aluminum alloy and that the inner tube (6), the connecting pieces (5) and the end sleeves which are screwed upon the threading of the connecting pieces consist of special steel.

3. A permanent magnetic liquid treating device according to one of claims 1 or 2, characterized in that the axial dimension of each ring magnet (3) is 9 mm and that of the spacer discs (4) is 3 mm, and the last spacer disc (4) at the outlet side having a thickness of 6 mm.

4. A permanent magnetic liquid treating device according to any of claims 1 to 3, characterized in that the inner tube (6) has a diameter of 0.5 inch (12.6 mm) and a length of 100 mm. and that the helically wound strip (7) being prepared from a sheet of special steel of 0.5 mm thickness has 1 to 2 helix windings in the inner tube.

5. A permanent magnetic liquid treating device according to any of the preceding claims, characterized in that an elastic sealing ring (10) surrounding the inner tube (6) is inserted between each of the outwardly last spacer discs (4) and the adjacent sleeve (9).

6. A permanent magnetic liquid treating device according to any of claims 1 to 5, characterized in that the helically wound strip (7) is smooth or provided with projections which serve to create turbulence within the liquid flowing therethrough.

7. A permanent magnetic liquid treating device according to any of the claims 1 to 6, characterized in that the helix-free diametrical terminal section (8) of the metal strip (7) at the inlet end extends outwardly from the connecting piece (5) and terminates in a tip (14) with rounded straight edges or in a rounded tip (12) with a rounded round edge (12a).

8. A permanent magnetic liquid treating device according to any of claims 1 to 7, characterized in that at least the edges (14a, 12a) of the tips (14, 12) of the strip (7) have a coating of plastics material.

9. A permanent magnetic liquid treating device according to any of the claims 1 to 8, characterized in that both sides of the strip (7) are covered with a plastic coating.

10. A permanent magnetic liquid treating device according to any of the claims 1 to 9, characterized in that an insert (11) which reduces the flow section is arranged in the connecting piece (5) which is situated at the outlet side.

11. A permanent magnetic liquid treating device according to any of the claims 1 to 10, characterized in that the terminal outer part of the connecting pieces (5) is provided with a threading or smooth undulations for connection with a connecting pipe or tube, respectively.

ABSTRACT OF THE DISCLOSURE

A permanent magnetic liquid treatment device, including a tubular housing in which ring magnets and magnetizable spacer discs are located, coaxially to the longitudinal axis of the housing, and which has contact pieces at both ends. The device also has mechanisms which produce a screw motion in the liquid passing through and an inner tube which is located in the housing, coaxially to the longitudinal axis thereof and at a distance from the inner housing pieces. The ring magnet and spacer discs are installed in the liquid-free area between the inner tub and the tubular housing in such a way that they lie one behind the other in the direction of the longitudinal axis of the housing. The stacks of ring magnets and spacer discs are held in place in such a way that it cannot move and is tightly enclosed by means of sleeves screwed onto the contact pieces.

1/1

Fig. 1

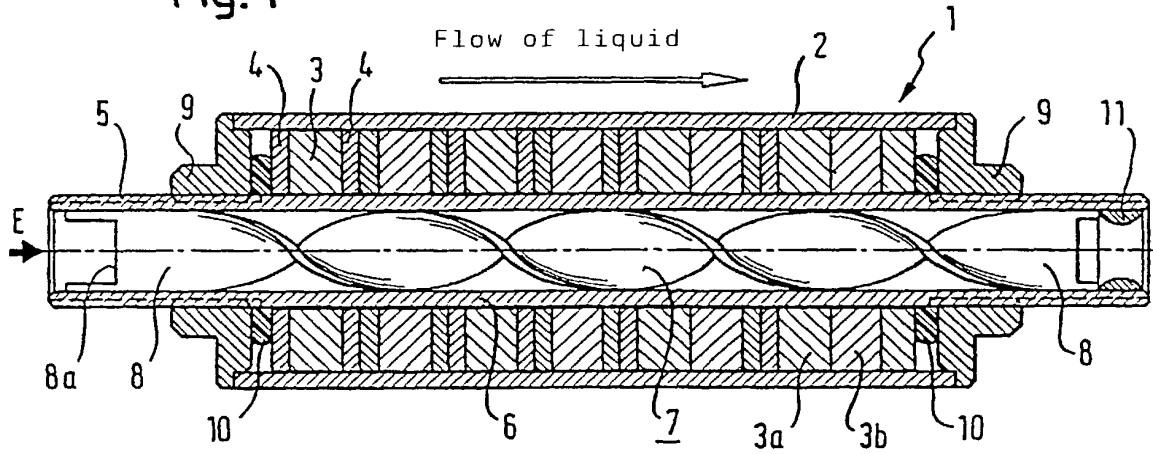


Fig. 2

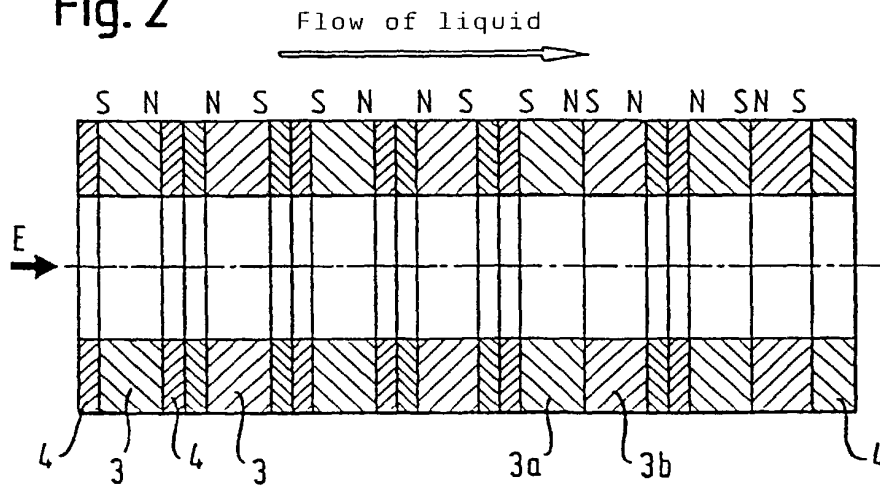


Fig. 3

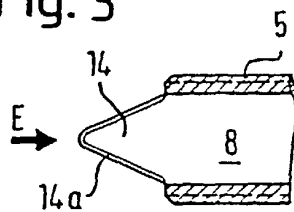
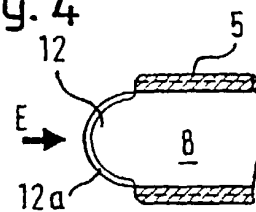


Fig. 4



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PTO/SB/81 (10-00)

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Application Number	10/070,100
Filing Date	Feb.28,2002
First Named Inventor	JANS, Manfred Ernst
Group Art Unit	
Examiner Name	
Attorney Docket Number	1843-1

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Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96).
SIGNATURE of Applicant or Assignee of Record

Name	Manfred Ernst JANS				
Signature					
Date	12th March 2002				

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

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My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PERMANENT MAGNETIC LIQUID

TREATING DEVICE

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Priority Not Claimed
Priorität nicht beansprucht

_____ (Day/Month/Year Filed) (Tag/Monat/Jahr der Anmeldung)	<input type="checkbox"/>
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_____ (Status) (patented, pending, abandoned) (Status) (patentiert, schwebend, aufgegeben)
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_____ (Status) (patented, pending, abandoned) (Status) (patentiert, schwebend, aufgegeben)
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Al Harrison; 31,708

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Vor- und Zuname des einzigen oder ersten Erfinders	Full name of sole or first inventor	<u>Manfred Ernst JANS</u>
Unterschrift des Erfinders <u>Heffer</u> Datum <u>27.3.2002</u>	Inventor's signature <u>Heffer</u> Date <u>27.03.2002</u>	
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Unterschrift des zweiten Erfinders Datum	Second Inventor's signature Date	
Wohnsitz	Residence	
Staatsangehörigkeit	Citizenship	
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